

IN THE CLAIMS

Claims 1-20 (Canceled)

21. (New) A magnetic disk storage apparatus comprising:
a magnetic head having a read head and a write head;
the read head having a lower shield, an upper
shield, and a read element formed between the lower shield and
upper shield;
the write head having a main pole, one or more
auxiliary poles, and coils located on both sides of the main
pole; and
a magnetic medium having a soft magnetic underlayer
and a magnetic recording layer formed above the soft magnetic
underlayer,
wherein a magnetic field from the main pole enters
into the auxiliary pole through the magnetic recording layer
and the soft magnetic underlayer,
the coils are arranged so as to magnetize the main
pole in accordance with an electrical current flowing in the
coils, and
the coils generate different respective magneto-
motive forces.

22. (New) A magnetic disk storage apparatus comprising:

a magnetic head having a read head and a write head;

the read head having a lower shield, an upper shield, and a read element formed between the lower shield and an upper shield;

the write head having a main pole, one or more auxiliary poles, and coils located on both sides of the main pole; and

a magnetic medium having a soft magnetic underlayer and a magnetic recording layer formed above the soft magnetic underlayer,

wherein a magnetic field from the main pole enters into the auxiliary pole through the magnetic recording layer and the soft magnetic underlayer,

the coils are arranged so as to magnetize the main pole in accordance with an electrical current flowing in the coils, and

a current flowing in the coil located on a side of the main pole having no auxiliary pole is greater than a current flowing in the coil located on a side of the main pole having an auxiliary pole.

23. (New) A magnetic disk storage apparatus comprising:

a magnetic head having a read head and a write head;
the read head having a lower shield, an upper
shield, and a read element formed between the lower shield and
upper shield;

the write head having a main pole, one or more
auxiliary poles, and coils located on both sides of the main
pole; and

a magnetic medium having a soft magnetic underlayer
and a magnetic recording layer formed above the soft magnetic
underlayer,

wherein a magnetic field from the main pole enters
into the auxiliary pole through the magnetic recording layer
and the soft magnetic underlayer,

the coils are arranged to as to magnetize the main
pole in accordance with an electrical current flowing in the
coils, and

a number of windings of the coil located on a side
of the main pole having no auxiliary pole is greater than that
of the coil located on a side of the main pole having an
auxiliary pole.

24. (New) A magnetic disk storage apparatus according
to claim 21,

wherein the main pole is formed between the read element and the auxiliary pole.

25. (New) A magnetic disk storage apparatus according to claim 24,

wherein a distance between the main pole and the auxiliary pole is smaller than a distance between the main pole and the upper shield.

26. (New) A magnetic disk storage apparatus according to claim 24,

wherein a product (μ_a/D_1) of an inverse of the distance D_1 and a permeability μ_a of the auxiliary pole is greater than a product (μ_s/D_2) of an inverse of the distance D_2 and a permeability of μ_s of the upper shield,

wherein D_1 is the spacing between the main pole and the auxiliary pole, and

wherein D_2 is the spacing between the main pole and the upper shield.

27. (New) A magnetic disk storage apparatus as claimed in claim 21, wherein said auxiliary pole is located only on one of said sides of said main pole so that the magneto-motive

force of said coil located on a side of the main pole having no auxiliary pole is greater than that of said coil located on a side of the main pole having said auxiliary pole.

28. (New) A magnetic disk storage apparatus as claimed in claim 21, wherein the ratio of the magneto-motive force of one of said coils to that of the other of said coils located on said sides of said main pole is 1.5 or more.

29. (New) A magnetic disk storage apparatus as claimed in claim 21, wherein the ratio of the magneto-motive force of one of said coils to that of the other of said coils located on said sides of said main pole is 2.5 or less.

30. (New) A magnetic disk storage apparatus as claimed in claim 21, wherein said auxiliary pole is located only on one side of said main pole so that a current flowing in said coil located on a side of the main pole having no auxiliary pole is greater than a current flowing in said coil located on a side of the main pole having said auxiliary pole.

31. (New) A magnetic disk storage apparatus as claimed in claim 30, wherein a ratio of the applied current value of

one of said coils to that of the other of said coils located on said sides of said main pole is 1.5 or more.

32. (New) A magnetic disk storage apparatus as claimed in claim 30, wherein a ratio of applied current value of one of said coils to that of the other of said coils located on said sides of said main pole is 2.5 or less.

33. (New) A magnetic disk storage apparatus as claimed in claim 21, wherein said auxiliary pole is located only on one of said sides of said main pole and the number of windings of said coil located on a side of the main pole having no auxiliary pole is greater than that of said coil located on a side of the main pole having said auxiliary pole.

34. (New) A magnetic disk storage apparatus as claimed in claim 33, wherein a ratio of the number of windings of one of said coils to that of the other of said coils located on said sides of said main pole is 1.5 or more.

35. (New) A magnetic disk storage apparatus as claimed in claim 33, wherein a ratio of the number of windings of one

of said coils to that of the other of said coils located on said sides of said main pole is 2.5 or less.

36. (New) A magnetic disk storage apparatus as claimed in claim 21,

wherein each of the coils is composed of a looped thin-film conductor.

37. (New) A magnetic disk storage apparatus as claimed in claim 21, wherein a distance between said main pole and said auxiliary pole is no greater than twice as long as the thickness of each coil located between said main pole and said auxiliary pole.

38. (New) A magnetic disk storage apparatus as claimed in claim 21,

wherein the opposed area of one auxiliary pole to a floating surface of the magnetic head being made smaller than the opposed area of another auxiliary pole to said floating surface, and

wherein the magneto-motive force of said coil located on the side of said auxiliary pole having a smaller

area is greater than that of said coil located on the side of said another auxiliary pole having a larger area.

39. (New) A magnetic disk storage apparatus as claimed in claim 38, wherein the current applied to said coil having said smaller area is greater than the current applied to said coil having said larger area.

40. (New) A magnetic disk storage apparatus as claimed in claim 38, wherein the number of windings located on said auxiliary pole having said smaller area is greater than that located on said auxiliary pole having said larger area.

41. (New) A magnetic disk storage apparatus as claimed in claim 38,

wherein said read head is located on the side of said auxiliary pole having said smaller area.